WHAT I CLAIM IS:

1. An acousto-optic device comprising:

a crystal medium having an active region, in which acoustic waves propagate;

an RF input portion for receiving an RF input, said input portion being disposed at one end of a direction of acoustic wave propagation;

a light input portion for receiving light from said source of light, said light input portion being disposed transverse to said direction of acoustic wave propagation; and

a light output portion;

whereby a series of periodic RF pulses input to said RF input portion is operative to generate a sequence of traveling lenses concurrently existing in said active region, said traveling lenses being operative to receive the light input at said light input portion and generate spot beams output from said light output portion.

2. The device as claimed in claim 1, wherein said crystal medium comprises one of fused silica, GaAs and TeO_2.

3. The device as claimed in claim 1 wherein said RF input signals comprise periodic chirped RF pulses, each pulse being operative to generate a lens in said traveling lens acousto-optic device.

4. The device as claimed in claim 1 wherein said plurality of concurrent lenses comprises at least three lenses.

5. The device as claimed in claim 4 wherein said plurality of concurrent lenses comprises approximately ten lenses.

6. The device as claimed in claim 1 wherein said crystal has an edge and said RF input portion is mounted at said edge.

7. The device as claimed in claim 1 wherein said crystal is a UV light–compatible crystal.

8. A method of operating an acousto-optic device having an active region and adapted to receive a source of light at a light input portion and a source of RF pulses at an RF input

portion for generating a plurality of traveling lenses that provide a plurality of concurrent spots from a light output portion comprising:

inputting to said RF input portion a series of chirped input pulses whereby an acoustic wave is formed for each input pulse and propagates in said active region in a propagation direction;

inputting to said light input portion light from said source and in a direction transverse to said propagation direction; and

applying said light to said propagating acoustic waves, said waves forming traveling lenses and concurrently existing in said active region, each said traveling lens being operative to focus and direct said light,

whereby a respective spot beam for each lens is output from said light output portion.

9. The method of claim 8 wherein at least three traveling lenses exist concurrently in said active region.

10. The method of claim 8 wherein said light comprises one of a single beam and a plurality of collimated beams.

11. A linear light detector apparatus for detecting a plurality of concurrently scanning spot beams, said light detector apparatus comprising:

a plurality of adjacent light detector sections disposed linearly along a common axis, each detector section comprising:

a plurality of adjacent light detectors, and

at least one multi-stage storage device operative to receive in parallel an input from said plurality of light detectors and to serially read out information stored in said multiple stages.

12. The linear light detector apparatus as claimed in claim 11 wherein each said light detector section comprises an input for section transfer signals and an output for serial readout of said section.

13. The linear light detector apparatus as claimed in claim 12 wherein each said detector section comprises a temporary shift register having plural stages, said shift register being operative to receive in each stage in parallel the content of a corresponding detector and to be read out serially.

14. The linear light detector apparatus as claimed in claim 11, further comprising a source of section transfer signals, said source providing section transfer signals to read out a plurality of said stages in series, and a data out line, including a buffer, to carry said serial read out signals.

15. A method for detecting a plurality of pixels stored in a linear CCD having a first plurality of sections, each section comprising a second plurality of pixel storage elements and receiving an input from a respective one of a third plurality of concurrently scanning beams, comprising:

capturing and storing the content of each of said third plurality of beams simultaneously in a respective signal storage section; and

concurrently serially reading out the stored signals.

16. The method of claim 15 further comprising synchronizing the timing of said scanning of said third plurality of beams and said readout of said stored signals.

17. The method of claim 15 wherein said capturing and storing step is conducted concurrently in only a portion of said first plurality of sections.

18. A system for inspecting a specimen comprising:

a light source providing a beam;

a traveling lens acousto-optic device having an active region and responsive to an RF input signal to concurrently generate plural traveling lenses in said active region, each lens having a focus, said traveling lens acousto-optic device being operative to receive the light beam and generate plural spot beams, at the respective focus of each of the generated traveling lenses, said plural spot beams scanning a first surface of said specimen; and

at least one light detector apparatus comprising a plurality of light detectors for detecting light originating with a respective one of said spot beams and at least one of reflected from said first surface or transmitted through said first surface.

19. The system as claimed in claim 18, further comprising a source of said RF input signals, said signals comprising chirped RF pulses, each pulse operative to generate a propagating lens in said active region.

20. The system as claimed in claim 18 further comprising a beam splitter operative to receive a first plurality of plural spot scanning beams and divide each said beams into a second plurality of spot scanning beams.

21. The system as claimed in claim 18 wherein said light source is a UV laser and further comprising a beam shaper disposed in a light path between said UV laser and said traveling lens acousto-optic device.

22. The system as claimed in claim 19 wherein said at least one light detector apparatus comprises a plurality of light detection sections, each detector section having a plurality of light detectors and at least one multi-stage storage device.

23. The system as claimed in claim 18 wherein said at least one light detector apparatus comprises at least one CCD and at least one PMT.

24. The system as claimed in claim 22 wherein each said detector sections comprises a temporary shift register having plural stages, said shift register being operative to receive in each stage in parallel the content of a corresponding detector and to be read out serially.

25. The system as claimed in claim 24, further comprising a source of section transfer signals, said source providing section transfer signals to read our said stages in series, and a data out line, including a buffer, to carry said serial read out signals.

26. A system for inspecting a specimen comprising:

a source of a plurality of concurrently scanning spot beams, said beams being imaged on a surface of said specimen and a plurality of reflected beams being produced therefrom;

at least one light detector unit, said at least one detector comprising a plurality of detector sections, each detector section having a plurality of light detectors and at least one multi-stage storage device operative to receive in parallel an input from said plurality of light detectors and to serially read out information stored in said multiple stages.

27. The system as claimed in claim 26 wherein each said light detector section comprises an input for a section transfer signal and an output for serial readout of said section.

28. The system as claimed in claim 26, wherein said source of a plurality of scanning spot beams comprises an acousto-optic traveling lens device having a single crystal for providing a plurality of traveling lenses to generate said plurality of beams.

29. The system as claimed in claim 28, wherein said acousto-optic traveling lens device generates said lenses in response to a series of chirped RF signals.

30 The system as claimed in claim 29, further comprising a traveling stage for said specimen, wherein said series of chirped RF signals are timed to produce a scan coordinated with movement of said traveling stage.

31. A method for inspecting a specimen comprising:

providing a plurality of spot beams from a single source of light;

scanning said plurality of spot beams at a surface of a specimen, whereby a corresponding plurality of at least one of reflected beams and transmitted beams are generated;

capturing and storing the content of each of said at least one of reflected beams and transmitted beams simultaneously in a respective signal storage section; and

serially reading out the stored signals from a plurality of said storage sections concurrently.

32. The method as claimed in claim 31 wherein said scanning step comprises concurrently scanning respective ones of said plurality of beams at different sections of said specimen.

33. The method as claimed in claim 31 wherein said scanning step comprises inputting a series of chirped RF signals, each chirped RF signal controlling the scanning of a respective one of said plurality of spot beams.

34. The method as claimed in claim 32 further comprising:

during a first period, scanning a first spot beam at a first section of a specimen surface and storing information from said first beam scanning at said first section; and

during a second period,

(a) scanning said first spot beam at a second section of a specimen surface, said second section being adjacent to said first section, and storing information from said first beam scanning at said second section;

(b) reading our serially the information from said first beam scanning stored during said first period; and

(c) scanning a second spot beam at said first section of said specimen surface and storing information from said second beam scanning at said second section.

35. The method as claimed in claim 34, further comprising during a third period:

(d) scanning said first spot beam at a third section of a specimen surface, said third section being adjacent to said second section, and storing information from said first beam scanning at said third section;

(e) reading out serially the information from said first beam scanning stored during said second period and reading out serially the information from said second beam scanning stored during said second period; and

(f) scanning said second spot beam at said second section of said specimen surface and storing information from said second beam scanning at said second section.

36. The method as claimed in claim 31, further comprising passing a first plurality of spot scanning beams through a beam splitter and creating a second plurality of spot scanning beams.

37. The method as claimed in claim 31 further comprising varying said RF signal to provide selective traveling lenses.

38. The method as claimed in claim 31 wherein said scanning further comprises moving said specimen.

39. The method as claimed in claim 31 wherein said at least one of reflected beams and transmitted beams comprises bright field and dark field components, said method further comprises separating said bright field and dark field components, and said step of capturing and storing comprises separately capturing said bright field components and capturing said dark field components.

40. The method as claimed in claim 39 wherein said step of capturing and storing comprises capturing said bright field components with a CCD and capturing said dark field components with a PMT.

41. The method as claimed in claim 39 wherein said step of separating is performed with at least one dichroic mirror.

42. The system as claimed in claim 23 wherein at least one CCD is for bright field detection and at least one PMT is for dark field detection.